Parcel E-2
Hot Spot Remedial Action Work Plan

Presentation Outline

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Remedial Action Objectives

- Further excavation is required at Parcel E-2 to address remaining near-shore and inland soil hot spots that pose a risk to human health and wildlife, in order to meet the following soil and sediment Remedial Action Objectives as presented in the Parcel E-2 ROD:
  - Prevent or minimize human exposure to inorganic and organic chemicals at concentrations greater than remediation goals for the following exposure pathways:
    - Ingestion of, outdoor inhalation of, and dermal exposure to solid waste, soil, or sediment from 0 to 2 feet bgs by recreational users throughout Parcel E-2.
    - Ingestion of, outdoor air inhalation of, and dermal exposure to solid waste, soil, or sediment from 0 to 10 feet bgs by construction workers throughout Parcel E-2.
  - Prevent or minimize ecological exposure to concentrations of inorganic and organic chemicals in solid waste or soil greater than remediation goals from 0 to 3 feet bgs by terrestrial wildlife throughout Parcel E-2.
  - Prevent or minimize ecological exposure to concentrations of inorganic and organic chemicals in intertidal sediment greater than remediation goals from 0 to 2.5 feet bgs by aquatic wildlife throughout the Shoreline Area.

Hot Spot Criteria

- **Tier 1 Hot Spots** consist of near-shore locations where soil concentrations are greater than 10 times the remediation goals and corresponding groundwater concentrations in monitoring wells consistently exceed aquatic evaluation criteria. Tier 1 hot spots were identified at the shoreline portion of the PCB Hot Spot Area.
- **Tier 2 Hot Spots** consist of near-shore locations where soil concentrations are greater than 10 times the remediation goals and corresponding groundwater concentrations in temporary wells exceed aquatic evaluation criteria. Tier 2 hot spots were identified at the Metal Slag Area, north of the Ship Shielding Area, and northwest of the PCB Hot Spot Area.
- **Tier 3 Hot Spots** consist of inland locations where soil concentrations are greater than 100 times the remediation goals. Tier 3 hot spots were identified along the northern sidewall of the PCB Hot Spot Area excavation and in the central portion of the East Adjacent Area.

Hot Spot Criteria (cont.)

- **Tier 4 Hot Spots** consist of near-shore locations where groundwater concentrations in temporary wells exceed aquatic evaluation criteria and no corresponding soil data are available. Tier 4 hot spots were identified in the northern portion of the Panhandle Area.
- **Tier 5 Hot Spots** consist of inland locations where soil concentrations are greater than 10 times the remediation goals and corresponding groundwater concentrations in downgradient temporary wells exceed aquatic evaluation criteria. Tier 5 hot spots were identified in the southern portion of the Panhandle Area and in the East Adjacent Area.

Proposed Hot Spot Excavations

Excavation ID No.[1]	Chemical Driver(s)	Area (square feet)[2]	Depth (feet bgs)[2]	Total Volume (with 1:1 benching) (bank cubic yards)
T1-EX-1A-1	PCBs	4,012	13	2,557
T1-EX-1A-2	PCBs	400	5	74[3]
T2-EX-2A-1	PCBs	1,455	5	269[3]
T2-EX-2A-2	PCBs	3,284	6	842
T2-EX-3A	Lead	18,619	3	2,069[3]
T2-EX-3B	Lead	1,600	16	2,010
T2-EX-3C	Lead	1,600	8	702
T2-EX-3D	Lead	948	6	328
T2-EX-4	Copper	1,600	3	178[3]
T2-EX-5	PCBs	1,600	10	854
T3-EX-1-1	Lead and TPH	1,800	5	333[3]
T3-EX-2-1	TPH	175	5	32[3]
T3-EX-2-2A	TPH	800	5	148
T3-EX-2-2B	TPH	1,400	8	564
T4-EX-1	TPH	1,600	10	963
T4-EX-2	TPH	1,600	10	963
T4-EX-3	PCBs, copper, lead, and zinc	7,653	10	3,765
T4-EX-4	PCBs	1,600	10	666
T5-EX-1	Copper, lead, and TPH	3,907	8	1,485
T5-EX-2-1	PCE	6,259	13	4,194
			Total Volume:	22,996

1 = Delineation of hot spot extents based on decision criteria described in Section 3.2.2 of the Design Basis Report (ERRG, 2013). Decision criteria are based on RI/FS and post-excavation sample data.

2 = Limits of excavation must be confirmed by pre-excavation samples.

3 = No benching required.

Pre-Excavation Characterization

- Pre-Excavation Characterization sidewall and floor samples will be biased to areas of known contamination.
  - Samples will be analyzed for excavation-specific chemical drivers.
- A tech memo presenting the pre-characterization results and proposed excavation boundaries will be prepared for regulatory review and approval.
- Pre-excavation characterization sidewall samples will be collected at a minimum frequency of one sample per 50 linear feet of proposed excavation sidewall length (or fraction thereof), and one sample for every 5 vertical feet of proposed excavation sidewall depth.
  - Pre-excavation samples w will not be collected at proposed sidewalls where a feature (20 foot buffer zone from landfill, proposed slurry wall) or property/parcel boundary restricts excavation, **except at the shoreline seep excavation (T2-EX-2A-2)**.

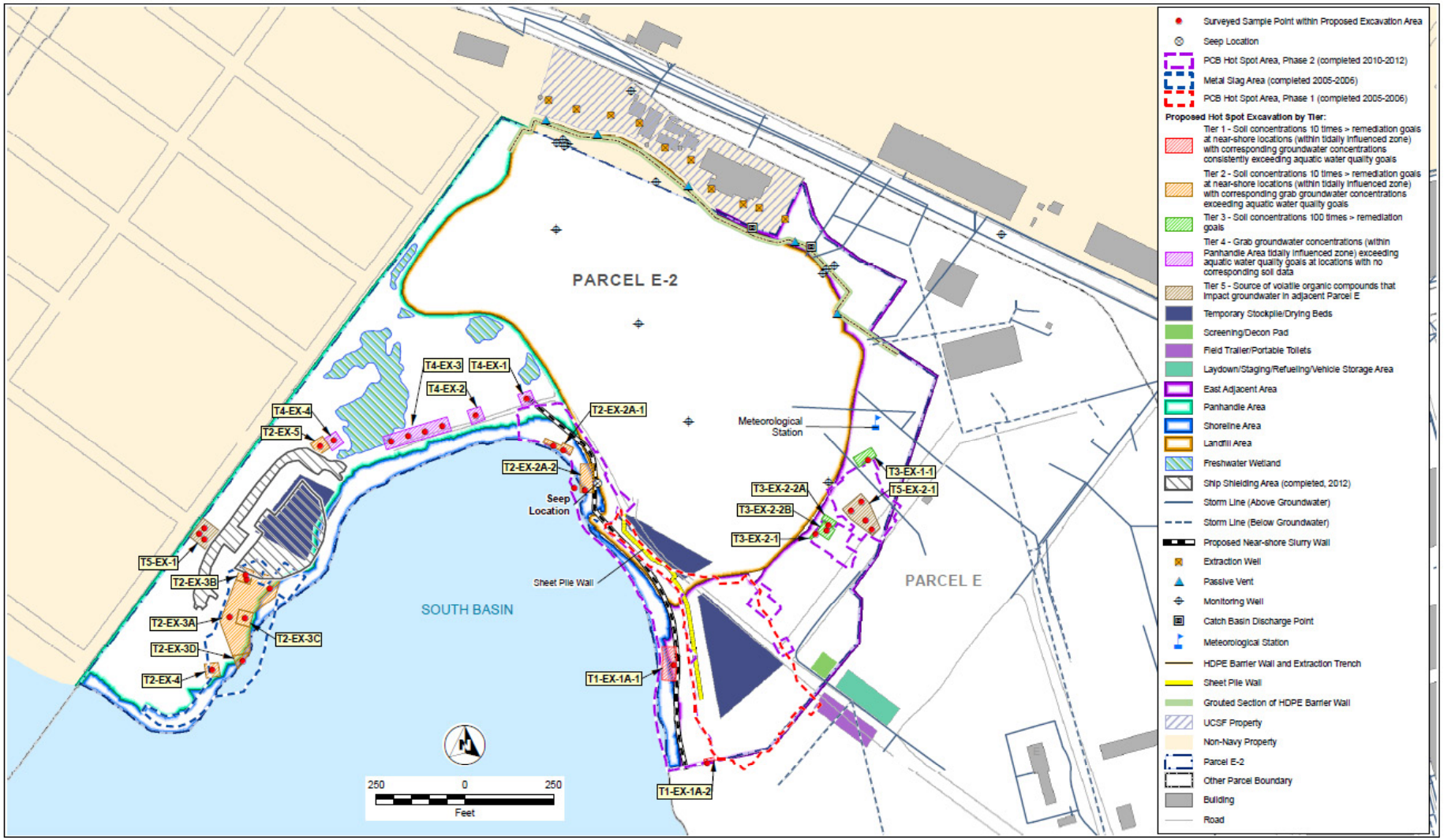
Pre-Excavation Characterization (cont.)

- Pre-Excavation Characterization floor samples will be collected at either 1 sample per 400 ft^2 or 1 sample per 900 ft^2.
  - 1 per 400 square feet (20' x 20' grid) in all Tier 1 excavations, and Tier 2 excavations adjacent to the landfill (T2-EX-2A-1 and T2-EX-2A-2)
    - Intended to thoroughly characterize these areas and minimize excavation of soil and sediment from the tidally influenced zone (TIZ).
  - 1 per 400 square feet (20' x 20' grid) in all Tier 4 excavations
    - Intended to thoroughly characterize areas where soil samples have not been collected.
  - 1 per 900 square feet (30' x 30' grid) in all Tier 3 excavations, Tier 5 excavations, and Tier 2 excavations in the Panhandle Area.
    - Excavations predominantly outside TIZ, driven by known points of soil and/or sediment contamination.
  - Floor samples will be collected from the 6" of soil column below the proposed excavation depth (e.g., excavations proposed at 3' bgs will have floor samples collected from 3'-3.5' bgs).
  - Hot Spots with depths greater than 5' bgs will also have 1 sample collected from 3' above the bottom sample.

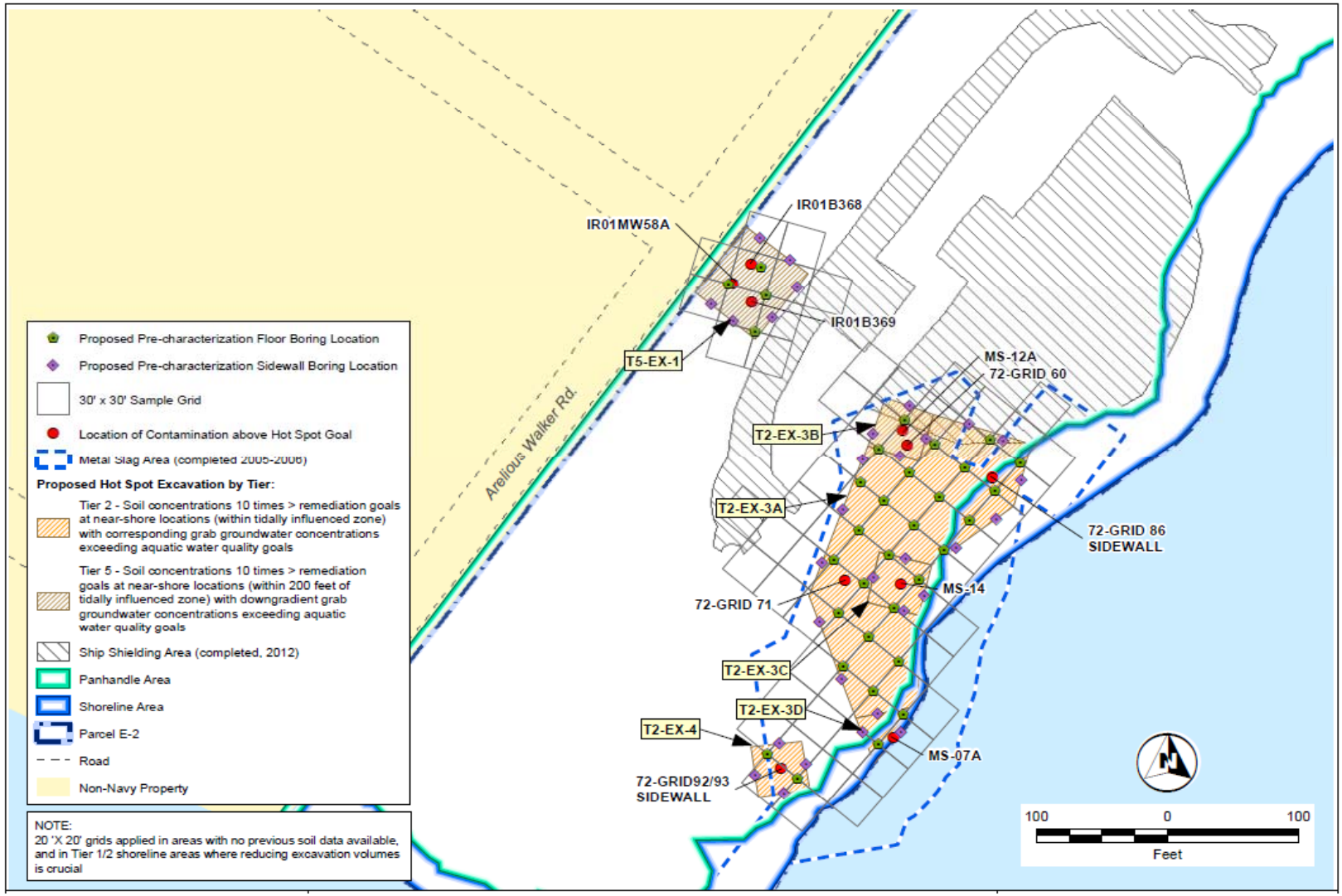
Shoreline Seepage

- Original E-2 shoreline seep location (shown on Slide 13) is located east (landward) of the proposed slurry wall.
- Two additional seepage areas to the northwest of original location are located within the footprint of a hot spot excavation area (T2-EX-2A-2).
- Although excavation will not extend beyond the proposed slurry wall, pre-excavation samples will be collected from the T2-EX-2A-2 sidewall along proposed slurry wall in order to characterize the area of the seep.
  - Sidewall samples will be collected every 50', and two additional sidewall samples will be included for additional characterization of the seepage area.
- Excavation will remove contamination from the Bayward side of the proposed slurry wall.

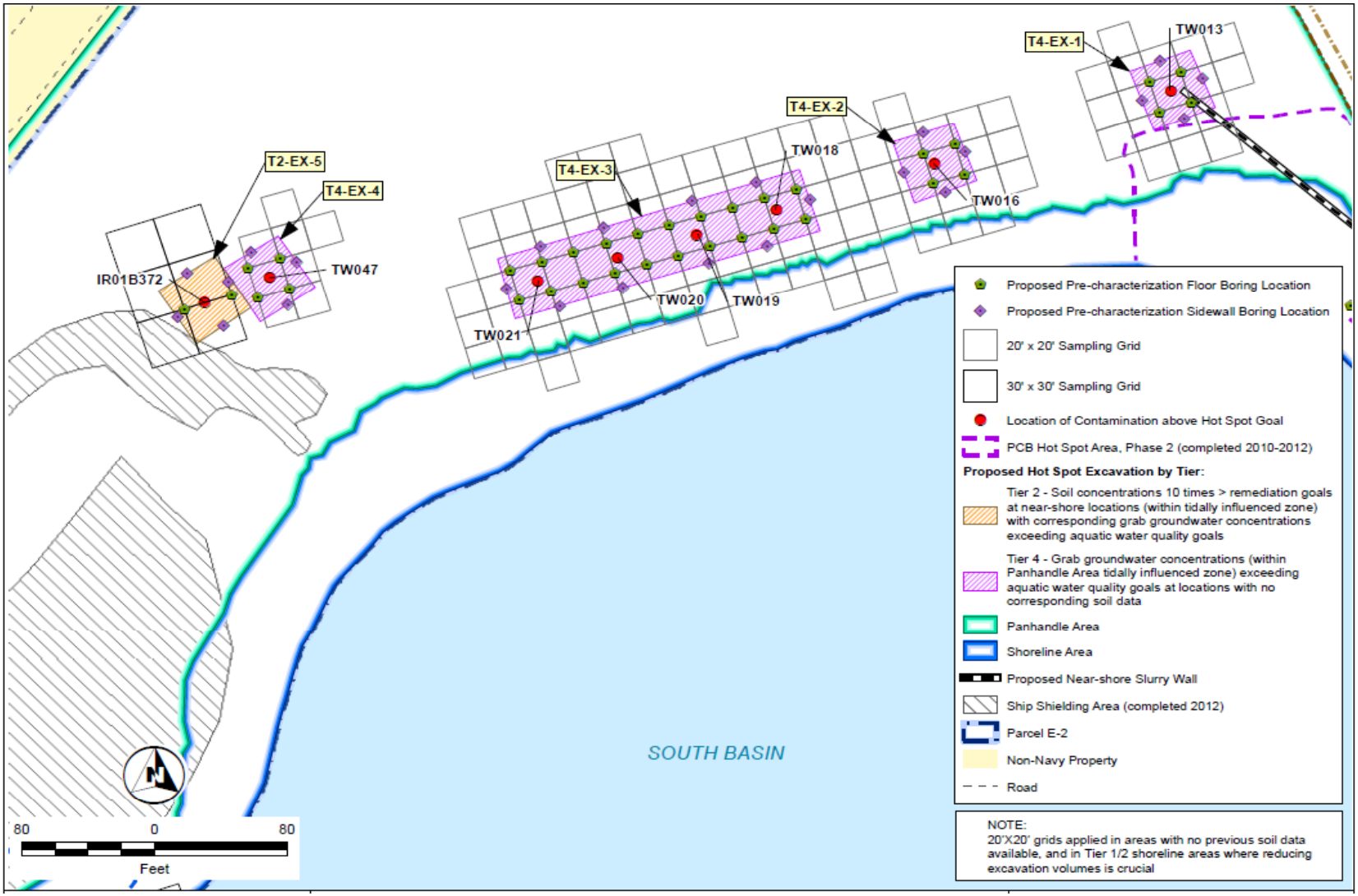
Hot Spot Areas – Overview



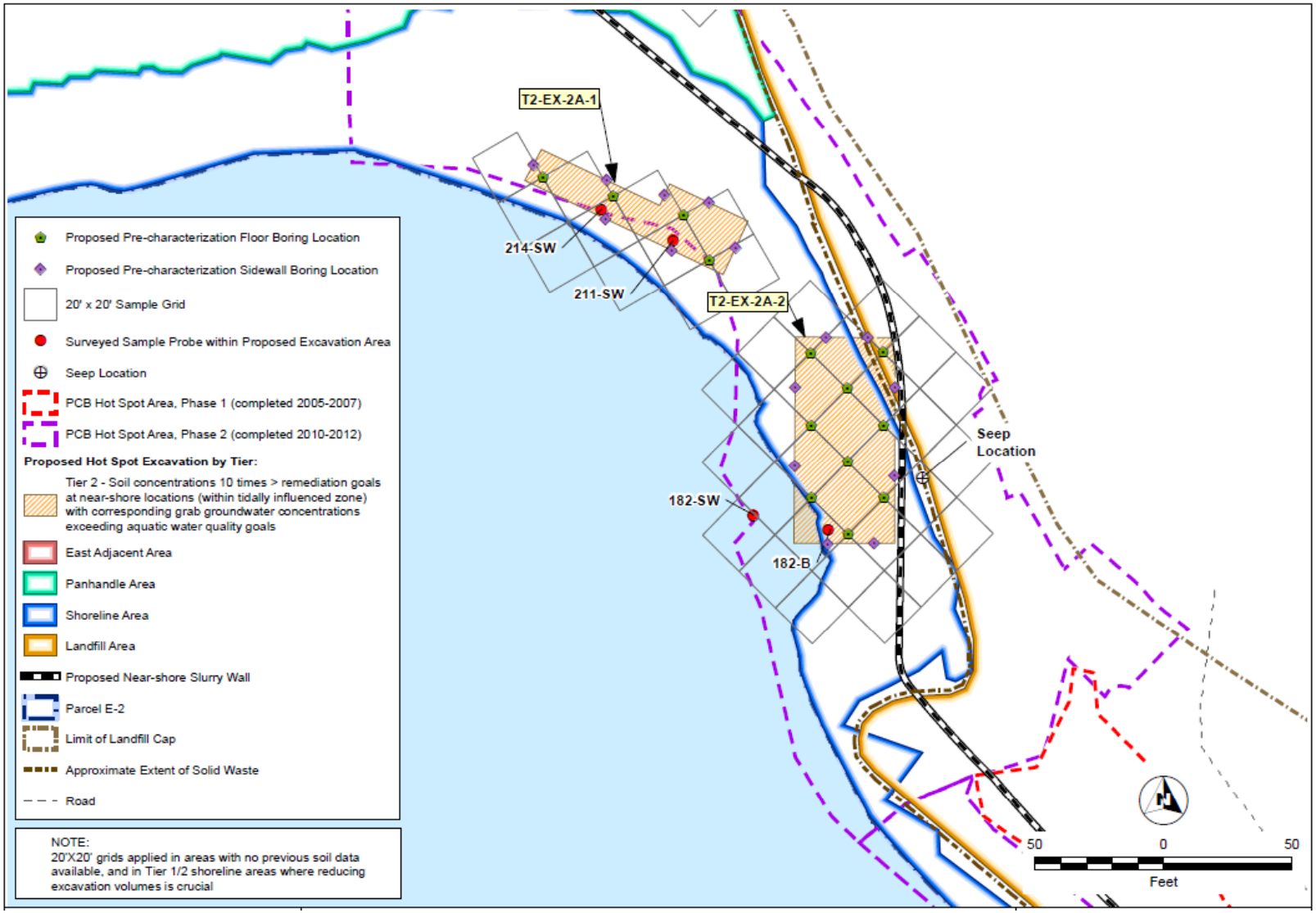
Hot Spots – Panhandle Area South



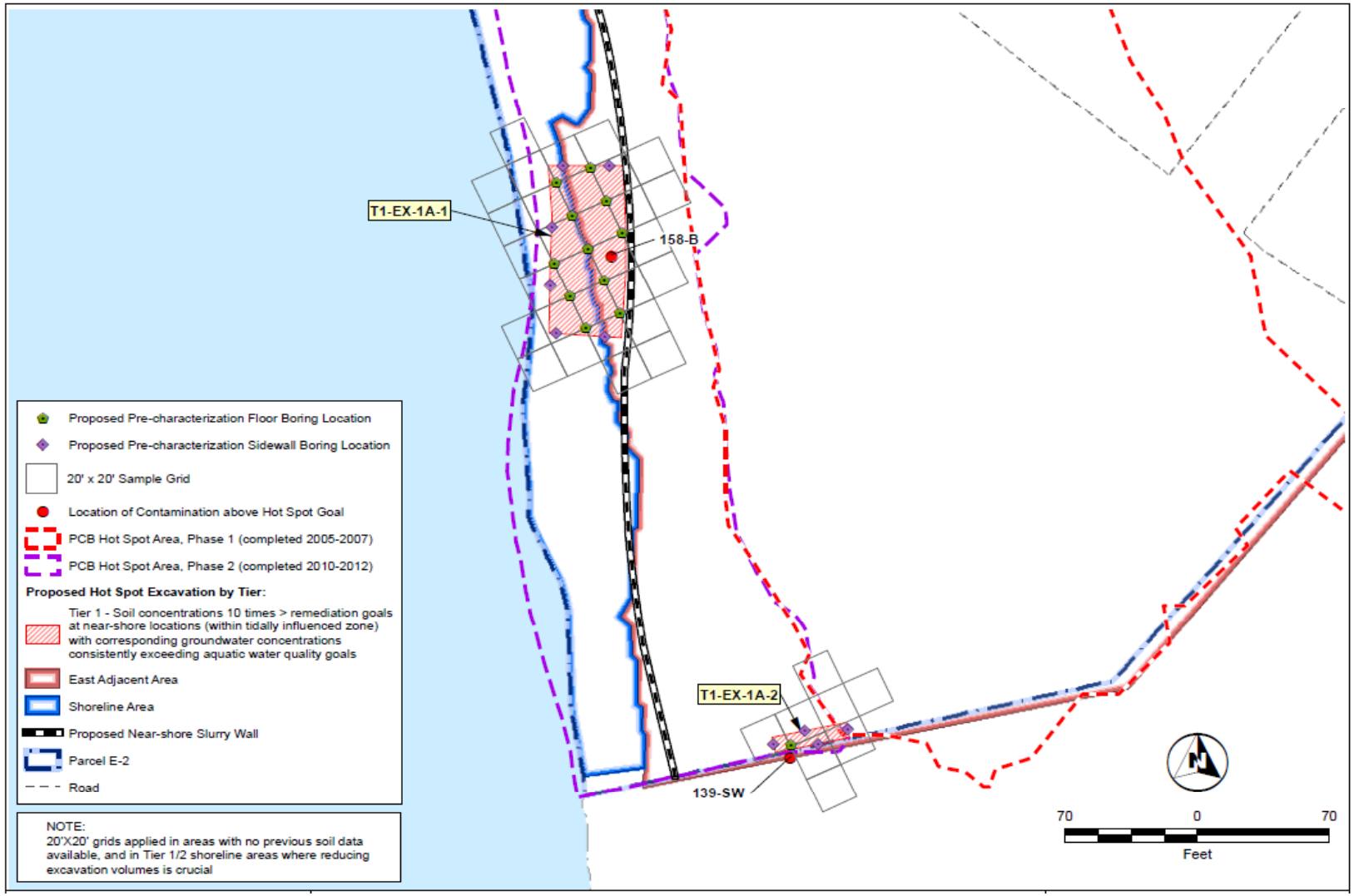
Hot Spots – Panhandle Area North



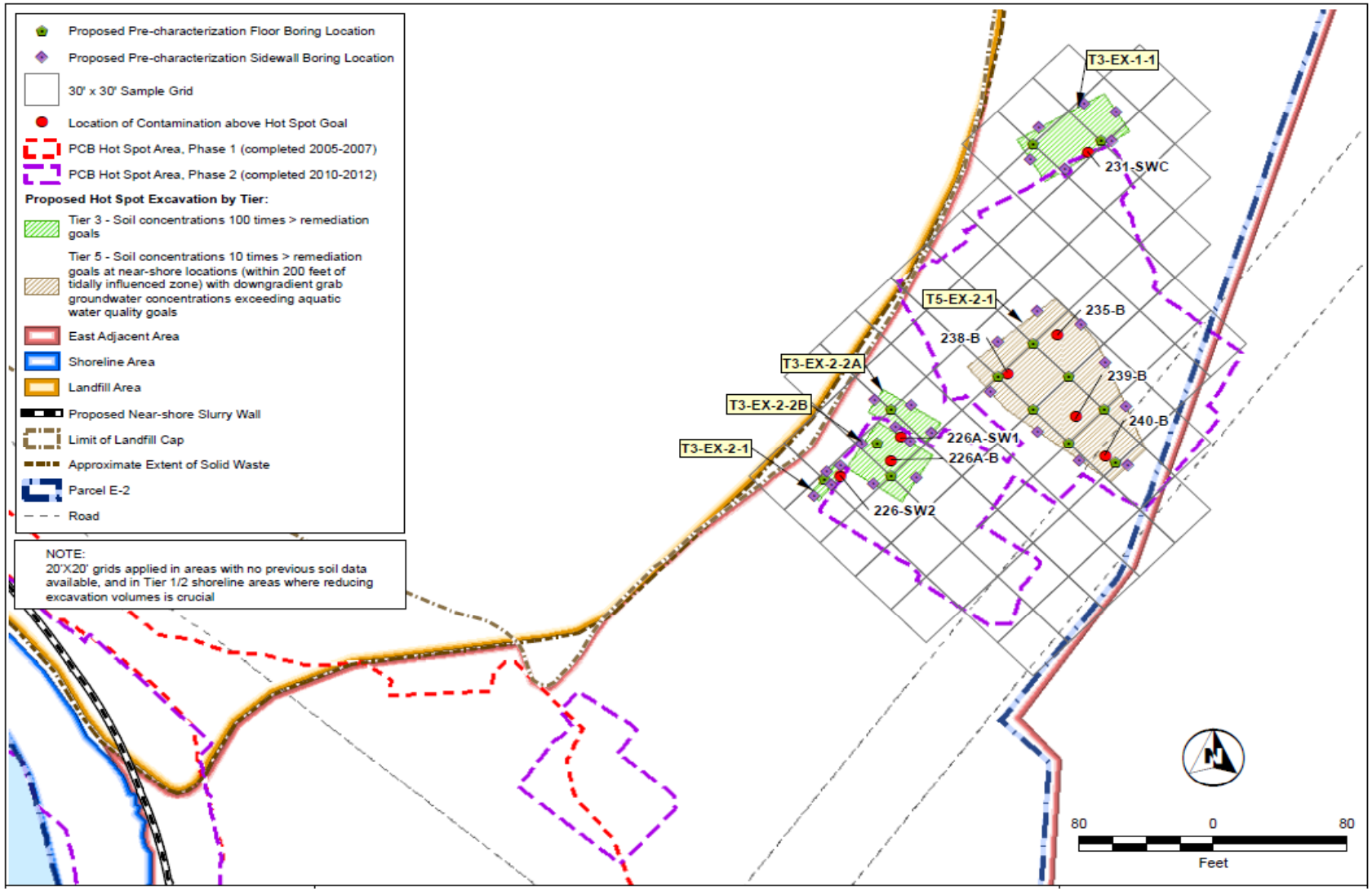
Hot Spots – Shoreline Area



Hot Spots – East Adjacent Area South



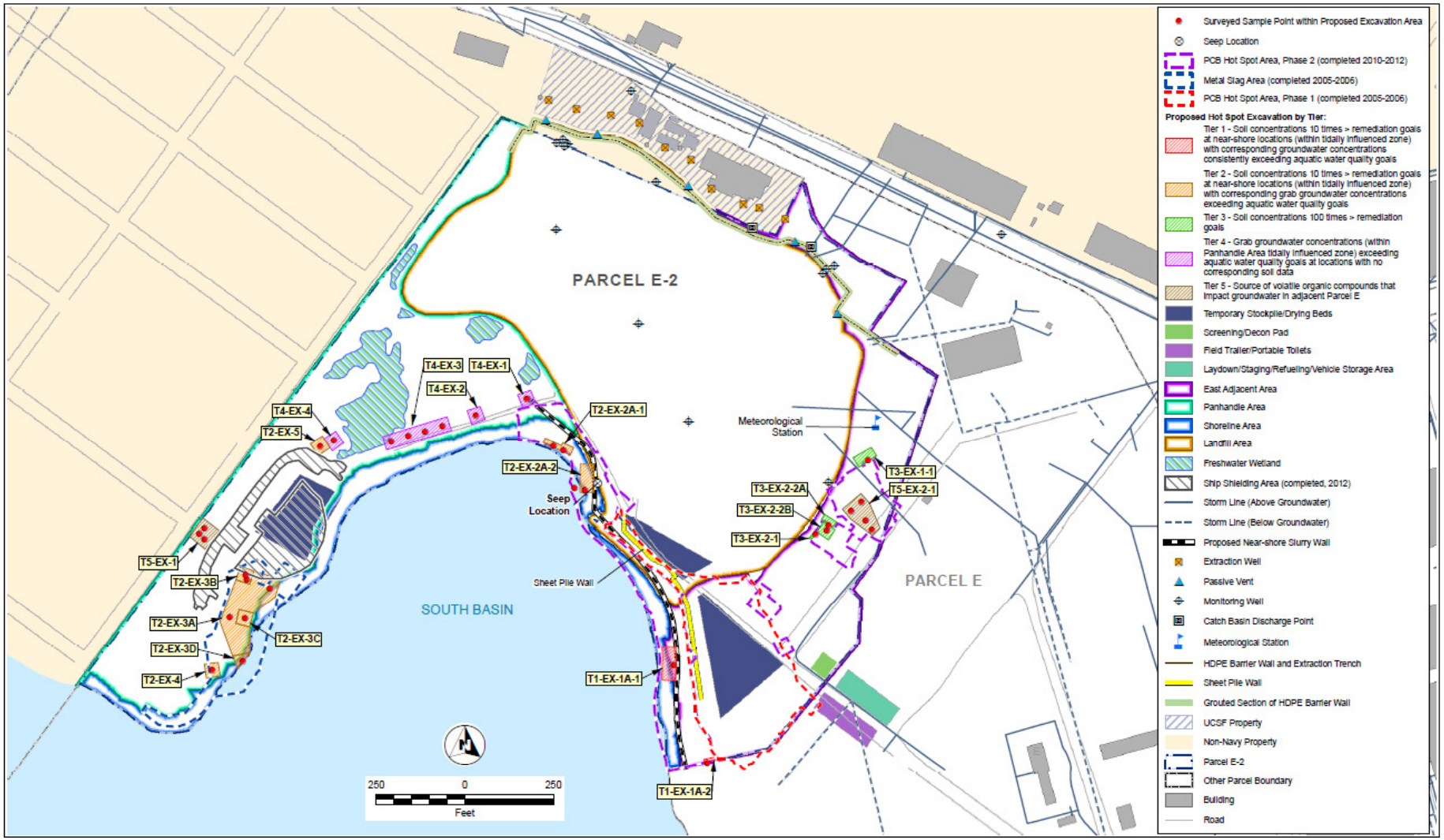
Hot Spots – East Adjacent Area North



Remedial Action Activities

- Following BCT approval of hot spot excavation boundaries, remedial activities will begin.
  - Excavation will begin in shoreline seep area (T2-EX-2A-2) and other shoreline excavations (conditions permitting).
    - A turbidity curtain will be installed prior to earth-disturbing activities in the TIZ, and a Bay Water Monitoring Plan implemented.
  - Excavation and backfill in TIZ may occur on same day, as conditions demand.
    - All post-excavation confirmation and radiological screening samples will be collected before backfilling.
  - Saturated soils will be dewatered before transportation.
    - Drying beds with sumps will be constructed near shoreline excavations, to drain and collect water from saturated soils.
  - Dewatered soils will be transported to Radiological Screening Yard (RSY) pads.
    - Soil will be laid in 6" lifts and screened for radiological contamination via MARSSIM methods.
  - Following radiological screening and clearance, soils will be stockpiled and sampled for off-site disposal profiling.
    - Removed radiological contamination will be transferred to the basewide low-level radiological waste (LLRW) disposal contractor.

Remedial Action Work Areas



Remedial Action Work Areas

Post-Excavation Confirmation Sampling

- Confirmation floor samples will be collected at 1 sample per 2,500 ft^2 (50' x 50' grid).
- Confirmation sidewall samples will be collected at a minimum frequency of 1 sample per 50 linear feet of excavation sidewall length.
  - Excavations less than 5 feet deep (that do not extend to groundwater), samples will be collected halfway down the wall.
  - Excavations deeper than 5 feet, sidewall samples will be collected at a frequency of 1 sample for every 5 vertical feet of sidewall.
- Confirmation sample locations will be biased to areas where high contaminant concentrations would be expected, or where field observations indicate the possible presence of contamination.
- In areas where excavation will not extend beyond a feature or boundary, post-excavation confirmation samples will be collected to document chemical and radiological 'as-left' conditions.
- Overexcavation and resampling will be performed as necessary until confirmation samples indicate hot spot goals have been achieved.

Radiological Screening

- All excavated soil will be initially screened at the point of excavation for radiological source material.
  - Gamma walkover scan to be performed over entire site prior to mobilization.
  - In non-saturated areas, excavations will be performed in 1' lifts, with soil screened in place between lifts.
  - Saturated soil will be placed on plastic and dried before moving to RSY pads.
- Following excavation and confirmation sampling, radiological surveys will be performed on excavations.
  - Where possible, MARSSIM studies will be performed to document 'as-left' radiological conditions.
  - For any excavations backfilled the same day, post-excavation confirmation samples will also be analyzed for radionuclides, constituting the 'as-left' radiological conditions.
- All excavated soils will be placed on RSY pads, then screened and cleared via MARSSIM methods prior to off-site disposal.

Schedule Update

Parcel E-2 Hot Spot Remedial Action

Submit Draft E-2 Hot Spot RAWP	Dec 20, 2013
BCT Comments Due	Feb 3, 2014
Submit Final E-2 Hot Spot RAWP	Mar 5, 2014
Pre-Excavation Characterization	Mar 6 – April 14, 2014
Submit Characterization Tech Memo to BCT	June 26, 2014
Hot Spot Excavation	Sep 2 – Mar 2, 2015
Draft Hot Spot RACR	June 11, 2015
Final Hot Spot RACR	Sep 30, 2015